SECTION II

RIVERS PROJECT DESCRIPTION

2.1. GENERAL

Public Lands

Forty-eight thousand acres of public owned lands are administered by the St. Louis District for the navigation impoundments. These are primarily confined to the low-lying areas of the floodplain along the banks of the pools, and some of the islands. The USFWS, IDNR and MDC partner with the Corps to manage significant portions of these lands for conservation, maintenance and management of fish and wildlife under a General Plan and Cooperative Agreement with the Corps. Except for Kaskaskia Lock and Dam and the Cache River Diversion Channel, there are no Corps managed public lands on the open river below Locks 27.

Table 2 - 1 summarizes information for the five navigation projects and the open river.

Table 2 - 1
Principal Features of Navigation Pools 24, 25, 26, Locks 27 and Kaskaskia Lock and Dam

	Pool 24	Pool 25	Pool 26 and MPLD	Locks 27	Kaskaskia	Open Miss.River
Length of Pool (miles)	27.8	32	MS -40.7 IL-80.1	15.6	35.2	N.A.
River Mile Limits	301.2 - 273.4	273.4 - 241.4	241.4 - 200.7	200.7 - 185.1	.8 - 36.2	0-185
Max Regulated Pool Elevation (NGVD)	449	434	419		368	N.A.
Pool Surface Area (acres)	13,000	18,000	32,000	489 (Canal only)	1,309	N.A.
Land Owned by Corps (original purchase)	8,513	9,514	24,514	3,733	433	Cache River 89
Operational Easements			12	225	2,465	
Corps Flowage Easement	1,979	1,526	4,496	211	3,496	
Privately Owned Shoreline	18 (29%)	39.7 (58%)	204 (80%)			100%

Waters

The Mississippi River is a major source of surface water supplies for communities along the river. The average flow meets current demands and is expected to satisfy projected demands. Extensive groundwater supplies of high-yield sand and gravel aquifers underlie major parts of the region. The thickness of these layers varies from 70 to 100 feet. Industrial and municipal pumping accounts for most of the water withdrawals. Yields of 1,000 gallons per minute and over are common for individual wells.

The water resources serve many needs. Variations in precipitation, topography, regulation, flood control works and land use practices cause fluctuations in flow rate. Cumulative mean flow of the Mississippi more than triples between Grafton, Illinois (55,000 cubic feet per second) and Thebes, Illinois (190,400 cubic feet per second).

The Illinois River is a major source of surface and ground water supplies throughout its length. The average flow currently meets the surface water supply demands and it is expected to meet future demands as well. Above DePue, the river valley is narrow and only scattered sand and gravel deposits are present for development. Much of the water use from this portion of the river is through surface water withdrawals. Below DePue, extensive sand and gravel deposits occupy the bottomland portion of the waterway. Wells tapping these deposits range in depth from 30 feet to 165 feet with reported pumping rates up to and over 1,000 gallons per minute. Industrial, municipal and irrigation pumpage account for almost all of the water withdrawals from this portion of the river.

Shoreline

Shoreline areas and islands under federal fee ownership provide numerous recreational opportunities available on the navigation pools, rivers and islands. Many of the public-owned shoreline acres developed for public use are contiguous with a public road network from which access to the shoreline is feasible and economical. Other project shoreline lands with characteristics desirable for the development of public access cannot be utilized because of privately owned land that intervenes between the project shoreline and the public road system. In some cases, shoreline lands are so far removed from the existing public road network that the provision of access roads to the project lands would be costly to build, operate and maintain.

Some of the shoreline acres have only flowage easement rights purchased by the Government during the original acquisition, which restrict certain private use and development activities. Federal ownership of shoreline on the navigation pools varies between 20 percent (Pool 26) and 71 percent (Pool 24).

2.2. FACILITIES AND INFRASTRUCTURE

Navigation, flood control, recreation, environmental, interpretive, and administrative facilities and structures are summarized in the following paragraphs. More detailed descriptions of these functional areas are described in other sections.

Navigation Locks and Dams

Navigation Pool 24

Navigation Pool 24 extends from the dam at Clarksville, Missouri, (RM 273.4) 27.8 miles up the Mississippi River to Lock and Dam 22 at Saverton, Missouri. The dam is approximately 73 miles north of St. Louis, Missouri. Missouri Highway 79, Illinois Highway 96 and U.S. 54 provide access to the project area. The project is located in Pike and Ralls Counties in Missouri and Calhoun and Pike Counties in Illinois. The Salt River, which is the principal tributary, flows into the pool from the Missouri side about 11 miles north of the dam and drains approximately 2,900 square miles.

The Corps acquired 8,513 acres of land in fee for construction of Navigation Pool 24. Control of an additional 1,979 acres of land is provided via flowage easements. The Corps-owned lands covered by this plan lie only slightly above the maximum regulated pool elevation. These lands,

except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi River. Most of these lands are valuable as fish and wildlife habitat. They also offer valuable recreational opportunities for hunting and fishing.

The pool has a water surface area of approximately 13,000 acres at maximum regulated pool elevation 449.0 NGVD.

There are approximately 62 shoreline miles along the pool, of which 18 miles, approximately 29 percent, are privately owned. The remaining 44 miles, 71 percent, of the shoreline are in government ownership.

Navigation Pool 25

Navigation Pool 25 extends from the dam at Winfield, Missouri, (RM 241.4), 32 miles up the Mississippi River to Lock and Dam 24 at Clarksville, Missouri. The dam is approximately 45 miles north of St. Louis, Missouri. Missouri Highway 79 and Illinois Highway 100 provide access to the project area. The project is located in Pike and Lincoln Counties in Missouri, and Calhoun County in Illinois. The Sny River, which drains about 750 square miles, is the principal tributary. It flows into the pool from the Illinois side about 20 miles north of the dam.

The Corps acquired 9,514 acres of land in fee for construction of Navigation Pool 25. Control of an additional 1,526 acres of land is provided via flowage easements. These lands, except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi River. Most of these lands are valuable as fish and wildlife habitat as well as for recreational opportunities for hunting and fishing.

The pool has a water surface area of approximately 18,000 acres at maximum regulated pool elevation 434.0 NGVD.

There are approximately 68 shoreline miles along the pool, of which 39.7 miles, approximately 58 percent, are privately owned. The remaining 28.3 miles, or 42 percent, of the shoreline are in Government ownership.

Navigation Pool 26

Navigation Pool 26 extends from Melvin Price Locks and Dam (the replacement for Locks and Dam 26) two miles downstream from Alton, Illinois (RM 200.7), 40.7 miles up the Mississippi River to Lock and Dam 25 at Winfield, Missouri, and up the Illinois River from its mouth at Grafton, Illinois to the LaGrange Lock and Dam, 80.1 miles upstream. The Melvin Price Locks and Dam is approximately 17 miles north of St. Louis, Missouri. Interstates 70, 270 and 255; US 67 (Missouri); Missouri Highways 79 and 94, and Illinois Highways 3, 111, 140, 143, and 100 provide access to the project area. The project is located adjacent to the Mississippi and Illinois Rivers in St. Charles and Lincoln Counties in Missouri, and Madison, Jersey, Calhoun, Green, Pike and Scott counties in Illinois. The principal tributary on the Mississippi River section of the pool is the Cuivre River, which enters the river from the Missouri side about 38 miles north of the dam and drains an area of about 1,230 square miles. Macoupin Creek is the main tributary on the Illinois River segment of the pool. It enters the river from the Jersey County side about 23 miles north of Grafton, Illinois. Macoupin Creek has a drainage area of about 947 square miles.

During the 1930s, the Corps acquired 22,010 acres of land in fee for construction of Navigation Pool 26. During the 1970s and 1980s, 2,504 additional acres were acquired for the Melvin Price Locks and Dam, of which about 1,482 acres were for mitigation purposes. Mitigation lands consist of 621 acres at Horseshoe Lake in Madison County, Illinois, and 862 acres on Cuivre Island in St. Charles and Lincoln Counties, Missouri (RM 233-239). Control of an additional 4,496 acres of land is provided by

easement estates. The fee owned lands, except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi and Illinois Rivers. These lands are valuable as fish and wildlife habitat as well as for recreational activities such as hunting, fishing, bird watching, hiking and photography.

Pool 26 has a water surface area of approximately 32,000 acres at maximum regulated pool elevation (419.0 feet) of which 25,900 acres are Mississippi River water and the remaining 6,100 acres are on the Illinois River.

There are approximately 260 shoreline miles along the Mississippi and Illinois Rivers, of which 204 miles, approximately 80 percent, are privately owned. The remaining 56 miles of the shoreline, approximately 20 percent, are in Corps fee ownership. Additional areas have flowage easement rights purchased by the Corps during the original acquisition, which restrict certain private use and development activities.

The dam consists of a 1,160-foot gated section and 2,000-foot overflow section. A 600-foot and 1,200-foot lock are located on the left bank.

Chain of Rocks Canal and Locks 27

The Chain of Rocks Canal was authorized by Act of Congress on 2 March 1945. The plan approved included a lateral canal on the left bank, or Illinois side, of the Mississippi River between RM 185.1 and RM 194.5 (above the mouth of the Ohio River) with a 1,200-foot main and a 600-foot auxiliary lock at the downstream end of the canal, approximately due west of Granite City, Illinois. Included as part of the Mississippi River Nine-Foot Channel Project, this project was designed to bypass a dangerous reach of the Mississippi River in which rock ledges, excessive velocities, and shallow navigation depths constituted hazards to navigation. Levees were constructed on each side of the canal, the west canal levee affording protection to the Chouteau Island Drainage and Levee District, and the east canal levee forming a component part of the riverfront levee system of the East Side Levee and Sanitary District which protects the valuable industrial area adjacent to East St. Louis, Illinois. Construction of the canal, levee and locks was essentially completed in February 1953 when the project was first opened to river traffic. The Corps project lands total 3,733 acres, which includes 3,453 acres purchased in fee and 280 acres that were transferred to the Corps for the purpose of the project from the Granite City Army Depot. Control of an additional 211 acres is provided by flowage easement estates.

Upon completion of the Chain of Rocks Canal and Locks 27, the problem of the rock ledge in the river at RM 190.3 on the Mississippi River was eliminated. However, occasional low flows resulted in less than nine-foot project depth over the lower concrete sills at the locks at Alton. To alleviate this problem, a low water rock-fill dam was constructed across the river. Dam construction started in fiscal year 1959. The dam is located at RM 190.3 and is built to an elevation which ensured a minimum of ten feet of water over the lower sills at Locks and Dam 26, thus eliminating the low flow navigation difficulties at that location. The project was placed in operation in November 1962 and is still required today for the Melvin Price Locks and Dam operation.

A Locks 27 harbor was authorized in WRDA 1986 to include two phases. The first phase was a 3,450-foot long, 210-foot wide harbor, approximately located at Chain of Rocks East Levee stations 193+00 to 227+00. After industrial development behind this harbor filled in, phase two would be built in the same dimensions as phase one from approximately 227+00 to 262+00, just downstream of Chouteau Slough. The total

project after two phases would be 6,900 feet long by 210 feet wide. A reevaluation report is currently being prepared addressing location and sizing of the harbor.

Kaskaskia River Navigation Project

The Kaskaskia River Navigation Project is located at Kaskaskia RM 0.8 on a reconstructed portion of the Kaskaskia River channel in Randolph County, Illinois approximately 20 miles north of Chester, Illinois. Channel improvements extend upstream through Monroe County to Fayetteville in St. Clair County, Illinois. Through channelization, the river distance between Fayetteville, Illinois and the confluence of the Kaskaskia River with the Mississippi River at Mississippi RM 118 has been effectively reduced from 50 to 36 miles. The project consists of a 600-foot lock, upper and lower floating guidewalls and a dam containing a movable section of two tainter gates. The dam site is bounded on the right bank by the Prairie du Rocher Levee District levee. The project's maximum regulated pool elevation is 368.0 NGVD. The project was placed in operation and pool was established on 10 July 1974.

Congress authorized the Kaskaskia River Navigation Project (PL 87-874) in 1962. With authorization of the project, coordination was initiated between the Corps and the sponsor of the project, the State of Illinois.

The resulting "Memorandum of Understanding between the U.S. Army Engineer District, St. Louis and the State of Illinois, Department of Public Works and Buildings" describes the project and outlines duties and responsibilities of the parties concerned and local cooperation required for completion.

Acreage acquired by the Corps for the project included 433 acres in fee-title, 2,465 acres in O&M easement and 3,496 acres in flowage easement. This land was acquired by the Illinois DOT and transferred to the Corps.

The State of Illinois owns approximately 17,000 acres adjacent to the navigation pool and therefore has complete control over the use and development of these lands. The State has formulated a plan of use for the lands known as the Kaskaskia State Fish and Wildlife Management Area lying along and adjacent to the project. The development of any private facilities on these lands will require permits from the State of Illinois, the St. Louis District and the Kaskaskia Regional Port District. Primary responsibility for management of these lands lies with IDOT. This department has furnished a substantial acreage of land to IDNR to be used for fish and wildlife management purposes, but subject to other developments as needed.

Under WRDA 1996, Section 321, the Kaskaskia River Navigation Project was modified to include fish and wildlife and habitat restoration as authorized project purposes. The St. Louis District will perform environmental stewardship work within the navigational servitude authority. A non-federal cost share partner is required for all habitat restoration work that may be pursued outside of the navigational servitude area.

The WRDA of 2000, Section 311, authorized recreation as a project purpose.

Summary

Table 2 - 2 summarizes the St. Louis District navigation facilities and infrastructure of the St. Louis District.

Table 2 — 2
Navigation Facilities and Infrastructure

River	Mississippi River				Kaskaskia
Navigation Project	24	25	Melvin Price	27	Kaskaskia
Number of Locks	1 RB*	1 RB*	2 LB*	2 LB*	1RB
Lock Dimension (ft.)	110x600	110x600	110x600 110x1200	110x1200 110x600	84x600
Dam Length (ft.)	1,340	1,296	1,160		130
Overflow Dike Length	2,000'	2,566'	2,000		
Gate (Number and width)	15 - 80'	14-60, 3-100'	9-110		2-60'
Gate Type	Tainter	Tainter, Roller	Tainter		Tainter
Guidewalls	2-600'	2-600'	4-900-1500'	2-600'	2
Year placed in Operation	1940	1939	1989 (2nd 1994)	1953/1962	1974

*RB = Right bank, LB=Left bank

Dredging and Dredged Material Uses

Dredging occurs in all the navigable rivers of the District. Two dredges are normally used to dredge various reaches of the river: the dustpan dredge (the *Potter*) is owned and operated by the Corps and a cutter head dredge is under contract to the District. The Corps maintains their dredge at the St. Louis District Service Base in St. Louis.

The St. Louis District coordinates with affected agencies regarding locations that may require dredging and the proposed disposal sites. When agency representatives recommend alternative disposal sites, all attempts are made to use them if feasible. Some of these are accepted wherever and whenever feasible. At other times it is not possible because of insufficient equipment capability, namely, a lack of enough pipeline to reach an alternate site or not enough pumping capacity to dispose dredge materials onshore. All dredged material disposal sites are coordinated with the natural resource agencies. Occasionally, emergency dredging takes place when the navigation channel is blocked.

When maintenance dredging occurs, excavated material is normally placed in the main channel border. When possible, beneficial use of dredged material occurs. The beneficial uses include beach creation for recreation, Least tern island habitat and sandy island habitat behind chevron dikes. Numerous river conditions are considered before placement of dredged material occurs including river stage; hydrologic, geomorphologic, and geometric properties of a particular reach of the river; volume of material to be dredged; capability of the equipment used; river structures in a reach such as dikes, revetments, and locks and dams; the volume of river traffic; and recommendations received from federal and state conservation and fish and wildlife agencies. Approximately 150 sites in the St. Louis District have been dredged at one time or another. Between 30 to 50 of these locations are dredged regularly. Some of these have to be dredged very infrequently, others annually, and some more than once during the navigation season. All dredging activities comply with applicable federal and state regulations. Approximately eighty million cubic yards of material are dredged annually within the St. Louis District.

Regulating Structures (Channel Maintenance)

Various types of regulating structures are used in the District's effort to maintain the navigation channel. There are approximately 800 dikes in the river and approximately 400 dikes in the pools, some of which are as old as 100 years. Dikes in the pools are generally below Ordinary High Water (OHW) except for approximately 40 that have been restored. Approximately 160 bendway weirs (low dikes angled upstream) are located in the open river. Four weirs were placed above L&D 24 in May 2000 to improve approach conditions. Relatively new structures known as chevron dikes have been placed at six locations in the pools. The Illinois and Kaskaskia Rivers do not have any Corps maintained regulating structures.

Navigation Pools

During the latter part of the 19th century, the currently pooled portion of the Mississippi River above the confluence with the Missouri River was wide and generally shallow, with numerous islands and emerging sandbars during periods of low flow.

Since 1824, the federal government has been involved in improving river conditions for navigation. Dikes made of wood and stone were used to confine the low flows to the main channel and temporarily increase stream velocities within the contracted reach, thereby increasing the stream's sediment transport capacity, thus deepening the navigation channel by scouring the riverbed. The sandbars between adjacent dikes soon became vegetated, with subsequent inundations depositing layers of finer-grained sediments such as silts and clays.

To alleviate the increased scouring action on the opposite bank due to the confinement of low flows, the lower portion of the riverbank was first usually protected with woven wooden mats placed against the bank and sunk with stone before the upper portion of the bank was revetted. Current methods to revet banklines utilize stone rip-rap. Stabilization of the riverbanks reduced the amount of lateral channel migration, thus reducing the number of new side channels that were being formed.

Prior to the establishment of Pools 24, 25 and 26, approximately 300 dikes and 65 miles of revetments were built. Due to their general deterioration and heavy ice-pack damage, a substantial portion of these structures was severely damaged or completely destroyed, thus significantly reducing their effectiveness.

The Open River

The unimpounded or open reach of river from the mouth of the Missouri River to the mouth of the Ohio River is also referred to as the Middle Mississippi River. This reach has characteristics which are a composite of those of the Upper Mississippi and the Missouri. From St. Louis to Grays Point, a distance of 134 river miles, the river flows between bluffs in an alluvial valley generally 4 to 5 miles wide. Its characteristics change in passing through the 7-mile long rock-bound gorge from Grays Point to Commerce, and again when it emerges into the wide delta-like valley of the lower Mississippi.

Environmentally Sound Navigation Structures

The St. Louis District has been cooperating with concerned agencies since 1969, in an effort to make the Nine-Foot Navigation Channel Project more compatible with aquatic and terrestrial habitats. This coordination process has resulted in the elimination of some proposed dikes, lowering the crown elevation on numerous other dikes, and construction of approximately 150 notched stone-fill dikes. Model and prototype studies indicate that not constructing some stone-fill dikes may eventually have an adverse impact upon the authorized channel dimensions

and may result in some increased dredging at some future date. A complete evaluation of notched dikes has been made as to their effectiveness for the enhancement of aquatic and terrestrial habitat. Other environmental enhancement features built into the project include stepped-up dikes, hard points and chevrons.

In 1989, the District introduced another channel improvement structure known as the bendway weir. Over 160 of these structures have been built between St. Louis, Missouri, and Cairo, Illinois. Submerged year-round, these structures add channel width in bends while stabilizing banklines on the outside of the bends thus significantly reducing maintenance dredging and barge accidents.

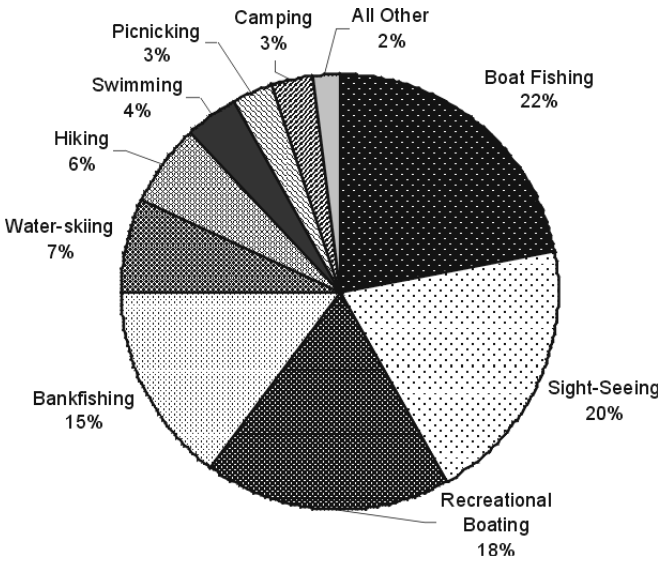
Flood Damage Reduction

Flood damage reduction is accomplished by use of levees, floodwalls and reservoirs. Levees are built and maintained by the federal government, local governments or the private sector. In the St. Louis District, there are 42 federal levees, 47 non-federal levees and numerous private levees. Levees are categorized by their height and ability to resist flood conditions. Floodwalls are built in the urban areas where there is not room for levee structures. Floodwalls protect the City of St. Louis and Cape Girardeau. Five flood control reservoirs are located on tributaries to the Mississippi River within the St. Louis District. These reservoirs retain large amounts of water during flood conditions to prevent flooding on the Middle and Lower Mississippi River.

Recreation

The St. Louis District has responsibility for four developed recreation areas; twenty-six access sites and six commercial concession marina leases. Twenty-four recreational cabin subdivision lease areas (377 recreational cottage leases are still active) dot the riverbanks. The States of Illinois and Missouri operate three recreation areas and twelve access areas on Corps owned land and the USFWS operates six access sites. The Rivers Project Office operates a regional visitor center at the Melvin Price Locks and Dam area and project visitor information centers at Locks 27, Kaskaskia Lock and Dam, Clarksville Office and at the Rivers Project Administration facility.

Figure 2-3
Recreation Area Use on the Mississippi, Illinois, and Lower Kaskaskia Rivers in the St. Louis District



The rivers of the St. Louis District are a major recreational resource for the people who live in the bi-state area. Recreational points of interest include a portion of the Great River Road from the National Great Rivers Museum to Eldred and the Village of Kampsville, Illinois. This stretch of road and river was recently designated a National Scenic Byway. Also included are the Mark Twain Refuge Complex, the Lewis and Clark State Historic Site, the Corps' Environmental Demonstration Area, the Multi-Agency Confluence Greenway (Mississippi and Missouri Rivers) and a regional bike trail system.

According to a 1995 study by the Waterways Experiment Station entitled Economic Impact of Recreation on the Upper Mississippi River System, recreational use of the area in the St. Louis District is varied. Fishing from a boat is the most popular (23 percent), followed closely by sightseeing (20 percent), and recreational boating (18 percent). Other popular uses are shown in *Figure 2 - 3*.

Environmental

Natural Resources

The Mississippi is one of the world's great rivers and one of its most complex ecosystems. It is a critical migration corridor for millions of birds and is essential to the ecological health of the North American continent. The river environment is home to an incredible array of fish, wildlife and plants. In turn, millions of people use and enjoy these diverse resources. The river, its floodplain, and its adjacent upland corridor are essential to the survival and dispersal of a great portion of the vertebrate species (particularly birds, amphibians, and fish) and aquatic invertebrate species that inhabit this continent. The Mississippi more than any other natural feature, is a globally recognized symbol of this nation.

The Mississippi River is the largest and longest river in North America. Its tributaries spread throughout the central United States, comprising a drainage basin encompassing 40 percent of the continental United States—an area totaling 1.9 million square miles. The drainage basin, the fourth largest in the world, is defined on the east by the Appalachian Mountains and on the west by the Rocky Mountains.

The bottomlands for the entire Mississippi make up the largest wetland area in the United States, and its bottomland hardwood forests are the most extensive in North America. More than half of the wetlands existing at the time of European colonization have been lost. The annual net loss of wetlands from the mid 1950s to the mid 1970s was mostly due to conversion to agriculture. In the following decade, there was a rapid decline in agricultural conversion and between 1982 and 1992, non-agricultural conversion accounted for over half of conversions. Wetland loss has been slowed considerably due to a governmental 'no net loss' policy.

More than 47 percent of the nation's duck population migrates along the river, and one-third of the freshwater fish species in North America live in the river. The river flows through eleven different eco-regions; this accounts for the great biological diversity of the river valley.

Since many of the characteristic birds of the river valley are migratory, the study area is of national and international significance. In addition, the Mississippi River and its tributary valleys form a natural route over which the non-migratory or semi-migratory species may expand their ranges. The river valley forms a wildlife corridor between the Gulf of Mexico and the Great Lakes Region. The mammalian species are generally representative of eastern (Alleghenian) types, with some influence of southern (Carolinian) and northern (Canadian) species.

Plant species in the river valley also enjoy conditions that are not generally associated with the geographic location of the river. Overlapping of eastern and western species and subspecies of plants as well as animals occurs in the river valley. In disturbed sites without previous growth where species of plants are beginning to grow, known as pioneer sites, found along sandbars, mud flats, and other open places of recent soil disturbances, the usual forest is dominated by black willow and cottonwood. In forested areas on the floodplain, silver maple, cottonwood, elm, hackberry, green ash, oaks, willows and box elder are the usual dominants.

Wildlife Habitat and Flyways

The wildlife habitats along the Mississippi River are important to a large number of migratory birds. Mature forested floodplain habitats in the Upper Mississippi, usually consisting of maples, cottonwoods and willows, are important to colonial-nesting birds such as herons, egrets

and double-crested cormorants. Farther south in the Lower Mississippi alluvial valley, bald cypress, gum, elm and various species of oaks provide important breeding, migration and winter habitat for numerous migratory birds. Neotropical migratory birds depend on these forests and brushy habitats for migration and breeding; studies have demonstrated the importance of this migration corridor to the species of migrants whose numbers are declining. The Mississippi River floodplain forest is also important to the bald eagle both for nesting and wintering habitat.

Most of the area within the floodplain of the river is wetland or converted wetland; this type of habitat is vital to many species of dabbling ducks for both migration and breeding. Both blue-winged teal and mallards nest on islands or in grasslands adjacent to the river, while wood ducks use tree cavities in the forests. Most importantly, the large, deep open pools of the river created by dams are vital to diving ducks, chiefly canvasback, redhead, lesser scaup and ring-necked ducks. Chief species using the Mississippi alluvial valley, which extends from southern Illinois to the coastal marshes of Louisiana, are the Mississippi valley and eastern prairie populations of Canada geese, snow geese, lesser white-fronted geese, and ducks such as gadwall, mallard, green-winged teal, American wigeon, American black duck, and northern pintail. Many other species of ducks use the river wetlands in lesser numbers.

Fisheries

The Mississippi River supports one of the most diverse fisheries in the world. One-third of all freshwater fish species in North America,195 species, live in the Mississippi River (Fremling et al. 1989). The diversity of the species generally increases from north to south. This diverse abundance of fish depends on many different aquatic habitat types including tailwaters, main channel, main channel border, side channel and backwater habitat.

In three of the four pools in the study area (Pool 24, Pool 25 and Pool 26), three aquatic zones occur. The upper end of each pool most closely mirrors the river's water level. In these areas, impoundment has had the least effect on the water levels. In this portion of the pools, marsh development is limited, and the pre-impoundment condition of deep sloughs and wooded islands are most common. As flows increase, the upper end of the pool becomes deeper until open river conditions exist. In the middle of each pool, impounded water is backed up over islands and floodplain wetland, spreading the river out over a large area. Water level remains relatively stable until open river conditions exist. Marsh development has occurred in the middle portion of the pools. Immediately above each dam (the lower pool), water was impounded to a depth that precluded most marsh development. At present, most of the lower pools' area is deep, open water except when flows increase and water level decreases. As noted for each zone of the pool, water levels change when pool operation is manipulated by use of a hinge point.

Upland erosion and the sedimentation in downstream areas are major causes of reduced water quality and habitat destruction in most mid-western rivers and streams. Sedimentation in the backwaters of the Upper Mississippi River is a significant environmental problem.

Impounding the river has slowed the river current and increased silt deposition. Impounding the river has created backwaters and side channel habitat which benefits species like the largemouth bass, bluegill, and crappie that prefer still water. Riverine and sediment-tolerant species like the channel catfish, buffalo, drum and sturgeon still predominate in areas with current such as the main channel and main channel border.

Interpretive Services/Educational Outreach

It is the intent of the Rivers Project Office to maintain an outreach and environmental interpretive effort consistent with Corps requirements. The Rivers Project Office will support environmental learning opportunities where feasible by collaborating closely with educational institutions and other partners.

The new administration building located along Riverlands Way Road on the Mississippi shore at the Melvin Price Locks and Dam includes a Type C Visitor Information Center. The Type C Visitors Information Center is limited to the placement of exhibits in existing buildings, or in new or rehabilitated administration buildings for the purpose of disseminating project information.

The 12,000 sq. foot Melvin Price Visitor Center, located on the Illinois Esplanade immediately adjacent to the new locks and dam, was authorized as a Type A regional visitor center. Developed with comments, support and guidance through a citizen's advisory group and peer review group, this facility will be used to tell the Corps story, the river story and the navigation story. The cultural, historical, ecological and biological responses will be interpreted at this major learning center. Visitors to the locks and dam will be able to view exhibits and tour the dam structure as well. Through partnering, a distance learning classroom has been established in the multi-purpose room for educational programming.

An access and tour control facility is located adjacent to the Rivers Project Administration building. It is a minimal facility that protects visitors from the inclement weather and serves as a meeting location for tours and interpretive programs.

Private Exclusive Use

Water and land areas at Corps projects are maintained for the benefit of the general public. After completion of the locks and dams in the late 30s, many cabin subdivisions were legally established on Corps lands along the rivers. This was an outgrowth of the Flood Control Act of 1944 that authorized recreation development at Corps water resources projects. Since the early 1960s, the permanent siting of floating cabins, cottages and non-transient mobile homes and trailers for private exclusive use on project lands has been discouraged. However, Section 6 of Public Law 97-140 established a moratorium until 31 December 1989 on enforced removal of certain existing private exclusive use type structures. Section 1134 of the WRDA 1986 (Public Law 99-662) extended the moratorium, indefinitely, for all such leased or permitted structures that existed on 17 November 1986 (date of the Act) if certain conditions (detailed in the Act) are met. Present policy stresses procedures for management of these private developments based on regional, project or site specific considerations in accordance with federal, state and local laws. These established procedures are applicable to all new, expanded or existing developments. A Mississippi Valley Division regional plan pertaining to private exclusive use is in effect for public lands and waters in the St. Louis District.

Administration

The main office for the Rivers Project is located at West Alton, Missouri. A sub-office is located in Clarksville, Missouri and project-specific administration and maintenance facilities are located at each navigation facility. The project manager and staff are responsible for all aspects of operations, maintenance and administration of all river navigation and water resource development projects and their natural, cultural, and recreational resources. The ranger staff is responsible for natural resource management, outdoor recreation, administering service contracts, health

and safety of visitors, visitor assistance, boundary surveys and marking, working with other federal and state and local agencies and informing the public of Corps activities. Navigation personnel assist in locking through of river vessels and maintenance of locks and dams structures. Maintenance workers and contract personnel are responsible for maintaining and servicing the hydraulic structure, painting, repair of facilities, and maintenance of trails and recreation facilities.

2.3. NATURAL RESOURCE MANAGEMENT PROGRAMS

Public Law 86-717 (Reservoir Areas-Forest Cover) and applicable implementing regulations declare the policy of the United States to provide that areas owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers shall provide for the protection and development of forest and other vegetative cover and the establishment and maintenance of other conservation measures on areas under Corps jurisdiction. The basic Corps environmental stewardship mission is carried out by identifying and implementing management practices which insure the conservation, preservation and protection of resources for present and future generations. The Corps will continue to promote the establishment, maintenance, and protection of vegetative cover, to include forest cover, grasses and other herbaceous communities in order to sustain the potential for forest production to sustain wildlife populations, and provide for basic erosion control during the life of the project. Corps natural resource management strategies are called out in this Project Master Plan and further detailed and specifically explained and scheduled in the Project Operational Management Plan to be developed subsequent to the Master Plan. The development of plans or other vegetative management activities are fully coordinated with the USFWS for input and review of compatibility of proposed actions with the wildlife enhancement uses of the project. Under the terms of this agreement, the USFWS on Designated Refuge lands or the appropriate states on General Plan/Coordination lands, will manage resources for enhancement for fish and wildlife.

The St. Louis District is ultimately accountable for the environmental stewardship of federal public lands acquired for the Mississippi River navigation system projects within its district boundaries.

Beyond stewardship, management of Corps lands includes attending to functions such as fire protection, safety, security, public protection, shoreline management and real estate management and disposal. Four recreation areas on the Mississippi River and its backwaters are maintained and operated by the Corps.

General Plan and Cooperative Agreement History

In addition to the Corps stewardship mandate promulgated by the Forest Cover Act, the USFWS, the IDNR and the MDC are authorized to manage 32,329 acres for fish and wildlife enhancement by a General Plan (land-use proposals) and Cooperative Agreement. General Plans and Cooperative Agreements were authorized in the Fish and Wildlife Coordination Act of 1934. The first cooperative agreement between Corps and USFWS was signed on 15 May 1945. Further amendments to the Fish and Wildlife Agreements caused the General Plans and Cooperative Agreements to be renegotiated. The 1954 Cooperative Agreement and the 1953 General Agreement and Public Land Order 939 made USFWS authority over Corps lands within the Refuge depend exclusively on the Cooperative Agreement. The 1954 Cooperative Agreement and the 1953 General Plans provided a unified system of administration over Corps lands, and other refuge lands were transferred to the Corps as part of the Nine-Foot Channel project. Additional cooperative agreements were negotiated between the states and the USFWS.

The 1961 General Plan and 1963 Cooperative Agreement further elaborated the rights and responsibilities of the Corps, USFWS and states to lands north of Cairo, Illinois, along the Mississippi River purchased by the Corps. It also provided the means for making minor adjustments at the district level in the lands transferred.

Recreation

Programs

Programs and activities related to outdoor recreation will have as their design the following mission statement:

Mission Statements

The U.S. Army Corps of Engineers is the steward of the lands and water at most federal water resources projects. Its Natural Resources Management mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other federal, state and local agencies as well as the private sector. Maintaining and improving this access to public lands is a high priority.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.

Program Objectives

- To provide a quality outdoor recreation experience which includes an accessible, safe and healthy environment for a diverse population of project visitors/users.
- To increase the level of self-sufficiency for the Corps recreation program.
- To provide outdoor recreation opportunities on Corps administered land and water on a sustained basis.
- To optimize the use of leveraged resources to maintain and provide quality public experiences at Corps water resources projects.
- To accomplish the program objectives, the Corps manages land and water resources in cooperation with other federal, state and local agencies, quasi-public organizations and the private sector supplemented by volunteers, contributions and challenge cost-sharing programs.

Project Master Plan and Operational Management Plans will be prepared in accordance with Chapter 3 of ER 1130-2-550.

Outdoor recreation and public use of project lands and water shall be on a ‘first-come-first-served’ basis.

Environmental Stewardship

The Corps is the steward of Rivers Project lands and waters. Its Natural Resources Management mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations. The environmental stewardship program objective is to manage the natural resources on Corps administered land and water in accordance with ecosystem management principles and to ensure their continued viability.

The USFWS, IDNR and MDC have extensive wildlife management programs on public lands managed by these agencies. New management programs on Corps land will be carefully coordinated with the existing programs so that the most good can be achieved.

The Corps is chartered through laws and regulations to manage public lands under its jurisdiction in such a manner which “conserves fish and wildlife,” “benefits wetlands,” and “provides a safe and healthy environment for visitors." The stewardship authorities afforded the Corps through the National Environmental Policy Act of 1969 (PL 91-190), the Water Resource Development Acts, the Forest Cover Act, and numerous engineering regulations within the agency, offer the natural resource managers several methods to accomplish their role.

Acting within existing authorities and consistent with the current master plan, the Riverlands Area Office and later the Rivers Project Office have been successful in initiating and advancing an environmental strategy for the future (known as Riverlands 2000). To date, a major environmental demonstration area has been completed and former agricultural leaseholds have been successfully reclaimed to native prairie and wetland habitats. An effort to resurvey and visibly mark the federal land boundaries is now underway. General operation and maintenance of federal recreation and concessionaire facilities have improved. Environmental Review Guide for Operations (ERGO) compliance is being achieved and phasing out of private exclusive use is being actively pursued and accomplished. Significant efforts have been made in raising public awareness of the Corps mission on the Mississippi River in a manner that is also striving to improve math and science literacy of students and create an interest in pursuing careers in science, technology, and civil service.

Interpretive Services and Educational Programs

The interpretive services and outreach efforts have created outputs and linkages with basin communities that are relevant and have served the entire project.

The Corps revised ER 1130-2-428 (now ER 1130-2-550), the Interpretive Services and Outreach Program (ISOP) Regulation in 1996. The strengthened ISOP program focuses on two major subject areas, environmental education and outreach. There are two main objectives of Environmental Education and Outreach: To foster both a local and global understanding of the interdependence of life on our planet, and to reduce management problems on public lands.

Important attributes in the ISOP program include achieving management objectives using interpretive techniques, communicating the Corps’ Civil Works and Military missions and accomplishments to the public, improving visitor safety, and enhancing the experiences and enjoyment of visitors to Corps projects. Outreach is a means of accomplishing these goals beyond the boundaries of Corps projects.

The Rivers Project ISOP strategy is to achieve the goals outlined in ER 1130-2-550 and to conduct these efforts in an efficient and effective manner at the field level so as to enhance understanding of both the Corps and the public's role and responsibilities. The Corps' ISOP has six goals:

- To achieve management objectives using interpretive techniques.
- To provide environmental education to foster voluntary stewardship of natural, cultural, and created resources.
- To incorporate the Corps Civil Works and military missions and accomplishments into interpretive programming.
- To improve visitor and employee safety using interpretive techniques.
- To use outreach techniques to accomplish ISOP goals, including interpreting Corps missions, promoting stewardship, saving lives, and solving management problems. As part of the interpretive process, encourage interest in math and science, including career interest.
- To enhance the visitors' experience and enjoyment by anticipating their needs and providing interpretive resources to meet those needs.

The Rivers Project Office has identified six objectives to accomplish the Interpretive Services and Outreach Program goals:

- To incorporate public land issues into formalized educational structures.
- To increase availability of public lands for use as outdoor classrooms.
- To foster a sense of proprietorship towards public lands by the general public.
- To demonstrate the Corps' ability to improve math and science literacy.
- To provide public assistance through community outreach to raise awareness of public lands management.
- To gain insight on the communities needs and concerns regarding the Rivers Project Office management of lands and waters.

The Rivers Project Office ISOP meets these goals and objectives through several forms of unique programming. Through educational programs, the Rivers Project Office develops curriculum, including the St. Louis School Partnership Program, the Careers in Science Program, the Rivers Curriculum Project and the U.S. Geological Survey Water Resources Project. School programs offered at the Rivers project include "*What is a Wetland*," "*Locks and Dams - Inland Waterway Navigation System*," "*Prairies of the Past,*" "*Eagles along the Mississippi*," and "*Habitat Habits*."

Visitor Assistance

Visitor assistance is a management program designed to protect natural resources and government property while assisting project visitors. Park rangers serve as a regulation enforcer with full citation authority of petty offenses contained in Title 36, Part 327. Available use-of-force options include visual presence, verbal persuasion and unarmed self-defense. States, counties and other political subdivisions retain the statutory authority and inherent responsibility to enforce appropriate state and

local laws. The Rivers Project Office contracts with appropriate local (county-city) law enforcement agencies to provide these necessary services on public lands.

2.4. PUBLIC USE

Major Activities

Within the Mississippi River corridor are many diverse recreational opportunities. The states manage 42 areas, including boat access areas, waterfowl management areas and recreation areas. These state managed areas are visited annually by one-half million people. The National Park Service administers the Jefferson National Expansion Memorial that averages 3.9 million annual visits. More than 50,000 visitors hunt, fish, bird watch, study nature or sightsee on the two national wildlife refuges managed by the USFWS and on private lands along the Mississippi, Illinois and Kaskaskia Rivers. The yearly average for recreational boats locked through the navigation projects from 1995 to 1999 is 6,331.

Table 2-4
Visits

	Total
1989	5,262,907
1990	5,292,600
1991	6,926,124
1992	4,285,718
1993	4,500,003
1994	8,123,345
1995	8,285,812
1996	4,614,203
1997	4,263,800
1998	4,001,100
1999	4,370,626

Visitation

Total visits at Pool 24, 25 and 26, for all types of recreation activity on the project was reported as approximately 4,370,626 in 1999 as shown in *Table 2* – 4. Visits, the number of persons who enter the project for recreational purposes, were recorded, beginning in 1989. Visitation tabulated by recreation day and broken down by pool is presented in *Table 2 – 5.*

Table 2 — 4
Visitation-Recreation Days

Year	**Total**	Pool 24	Pool 25	Pool 26	Pool 27	Kaskaskia
1961		384,000	822,000	2,746,000	*	*
1962		386,000	828,000	2,761,000		
1963		412,000	882,000	2,939,000		
1964		396,000	849,000	2,828,000		
1965		401,000	860,000	2,867,000		
1966		406,000	871,000	2,903,000		
1967		390,000	836,000	2,786,000		
1968		396,000	848,000	2,826,000		
1969		386,000	814,000	2,685,000		
1970		383,000	819,000	2,655,000		
1971		407,000	863,000	2,719,000		
1972		407,000	868,000	2,719,000		
1973		256,000	495,000	1,549,000		
1974		542,000	1,020,000	3,121,000		
1975		455,000	1,390,000	4,060,000		
1976		502,000	1,396,000	3,939,000		
1977-87	No Data Available					
1988		514,600	1,654,600	4,025,00	*	*

* Data for Pool 27 and Kaskaskia currently unavailable